

## INTISARI

Aktivasi sel inflamasi oleh bakteri memicu pelepasan sitokin proinflamasi Interleukin 1 (IL-1), yang dapat meningkatkan destruksi tulang dan menjadi indikator derajat keparahan inflamasi. Gel ekstrak bawang putih (GEBP) mengandung *allicin*, flavonoid, fenol, etil linoleat, dan *thiacremonone*, yang terbukti mempunyai sifat antibakteri dan antiinflamasi. Tujuan penelitian ini untuk mengkaji GEBP 20% dan 40%, serta lama paparannya terhadap ekspresi IL-1 pada pulpa yang terinduksi LPS.

Jenis penelitian adalah *post-test only group control design* menggunakan 36 gigi molar pertama rahang atas kanan dan kiri yang berasal dari 18 tikus *Sprague dawley*. Terdapat 4 kelompok berdasarkan bahan uji yaitu basis gel, *Triple Antibiotic Paste* (TAP), GEBP 20%, dan GEBP 40%. Setiap kelompok masing-masing 9 gigi. Gigi dibor hingga perforasi pulpa, diinjeksi LPS *E.coli*, dan dibiarkan terbuka 24 jam. Tikus dikorbankan pada lama paparan 1 hari, 3 hari, dan 5 hari setelah aplikasi bahan uji. Pewarnaan preparat dengan *immunohistochemistry* (IHC) dilakukan untuk menghitung persentase rerata ekspresi IL-1 menggunakan *software ImageJ*.

Ekspresi IL-1 tertinggi setelah lama paparan 5 hari adalah basis gel ( $62.10 \pm 6.01$ ), diikuti GEBP 20% ( $22.28 \pm 7.51$ ), GEBP 40% ( $17.49 \pm 4.48$ ), dan TAP ( $13.04 \pm 2.65$ ). Hasil uji statistik menunjukkan data terdistribusi normal dan homogen. Uji *Two-way ANOVA* menunjukkan perbedaan bermakna pada kelompok perlakuan dan lama paparan. Kesimpulan penelitian ini adalah GEBP 20% dan 40% tidak memiliki perbedaan dalam menekan ekspresi IL-1. Gel ekstrak bawang putih 20% mempunyai ekspresi IL-1 terendah pada lama paparan 5 hari, sementara GEBP 40% pada lama paparan 1 hari.

**Kata kunci:** gel ekstrak bawang putih, konsentrasi, lama paparan, interleukin 1, inflamasi pulpa

## ABSTRACT

The activation of inflammatory cells by bacteria results in the release of the proinflammatory cytokine interleukin 1 (IL-1), which serves as an indicator of the severity of inflammation and increases bone destruction. Garlic extract gel (GEG) contains active compounds, namely allicin, flavonoids, phenols, ethyl linoleate, and thiocresonone, which have been proven to have antibacterial and anti-inflammatory properties. The objective of this study was to evaluate the efficacy of GEG 20% and 40% and the length of exposure in modulating IL-1 expression in LPS-induced pulp.

This study employed a post-test only group control design, with 36 maxillary first molar teeth on the both sides of 18 Sprague Dawley rats then further divided into 4 treatment groups. Each group has 9 teeth each. These comprised gel base, Triple Antibiotic Paste (TAP), GEG 20%, and GEG 40%, with each of these divided into exposure duration of 1 day, 3 days, and 5 days. The teeth were drilled to perforate the pulp, injected with *E. coli* LPS, and left open 24 hours. The rats were sacrificed according to the length of exposure after the application of the test material, and the average percentage of IL-1 expression was calculated using the ImageJ software.

The highest IL-1 expression after 5 days was on gel basis ( $62.10 \pm 6.01$ ), followed by GEG 20% ( $22.28 \pm 7.51$ ), GEG 40% ( $17.49 \pm 4.48$ ), and TAP ( $13.04 \pm 2.65$ ). The statistical tests results indicated that the data were normally distributed and homogeneous. The two-way ANOVA showed that there were significant differences between the treatment groups and the duration of exposure. The findings of this study suggest that there is no difference in the ability of GEG 20% and 40% to suppress IL-1 expression. The garlic extract gel at a concentration of 20% exhibited the lowest IL-1 expression at a duration of five days, while the GEG at a concentration of 40% exhibited the lowest IL-1 expression at a duration of one day.

**Keywords:** garlic extract gel, concentration, duration of exposure, interleukin 1, pulp inflammation